28^{th} TJIMO

Alexandria, Virginia

Round: **Practice Guts**

Problem 1. Alfredo rolls a fair, six-sided die. What is the probability that he rolls an odd number?

Problem 2. The expression $(2x-3)(5x+2)$ can be written as ax^2+bx+c. Find $a+b+c$.

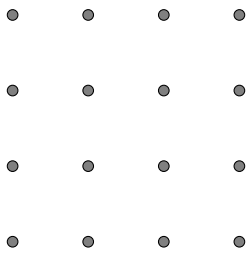
Problem 3. Simplify the fraction $\frac{\frac{12}{33}}{\frac{24}{35}}$.

Problem 4. How many factors does $2^4 \cdot 3^2 \cdot 4^3$ have?

Problem 5. Triangle ABC has $AB = 25$ and $BC = 7$. If $\angle C = 90^\circ$, find the length of AC.

Problem 6. Let $f(x) = 7x - \sqrt{x} + 3$. Compute $f(4)$.

Problem 7. How many squares have all 4 vertices in the array of 16 points below?



Problem 8. Express $0.\overline{47} = 0.47474747\ldots$ as a simplified fraction.

Problem 9. Compute 25×316484.

Problem 10. What is the largest prime factor of $25^2 - 14^2$?

Problem 11. Three consecutive odd integers add up to 27. If I subtract 1 from each of these numbers and multiply them all by 6, what is their new sum?

Problem 12. Rectangle A has side lengths 5 and 4, and Rectangle B has side lengths 7 and 2. What percentage of Rectangle A's area is Rectangle B's area?

Time limit: 10 minutes.